

CLIMATOLOGICAL DATA FOR AUGUST 1912.

DISTRICT No. 6, MISSOURI VALLEY.

MONTROSE W. HAYES, District Editor.

GENERAL SUMMARY.

In Montana and Wyoming cool, wet weather prevailed through most of the month. In Colorado and all that portion of the drainage area to the east of the mountain States the first 15 or 20 days were cool and showery, but the latter part of the month was quite warm, and there was generally less rain than during the first of the month. There was some frost in the mountain States, North Dakota and the western counties of South Dakota, but the staple crops appear to have suffered very little, if any. Damaging hail occurred over small areas in northern Montana, western South Dakota, and in Missouri. Damage by lightning was comparatively light, when the rather large number of heavy rainstorms is considered, and it was confined chiefly to the lower part of the district. Thrashing was retarded by rainy weather in the Dakotas and Iowa, and excessive local rains in South Dakota and northwestern Iowa washed out railroads, interfered with traffic, and caused an overflow of the Missouri River in and around Pierre, S. Dak.

TEMPERATURE.

In the eastern counties of Kansas and Nebraska and in Iowa and Missouri the mean temperatures for the month were very near to the normal. North and west of this region they were considerably below the normal, the greatest departure being in the northwestern part of the district. There was a large range in temperature in all sections of the district. In each of the States, except Montana, one or more stations had temperatures of 100° or higher, while in Nebraska and the country to the north and west of that State there were localities in which the temperature fell to 40° or lower. In Montana, Wyoming, and Colorado there were some stations at which the minimum for the month was considerably below the freezing point, but they were in very elevated regions, or were in some other manner favorably situated for the occurrence of low temperatures. The few warm days in Montana and Wyoming formed no well-defined period; they were scattered irregularly through the month, the greater portion of which was abnormally cool. In the remainder of the district hot weather followed the low temperatures of the first 15 or 20 days. For St. Louis there is a trustworthy record of temperature extremes for each day of the year for the last 77 years; it shows that on August 3 and 4, 1912, the minimum temperature in St. Louis was as low as it has ever been on corresponding days since 1836, and on the 5th it was 1° lower than any previous record. There was a very gradual rise in the temperature after the 5th, but no seasonably warm weather prevailed during the first 15 days. The last 10 days, in the territory to the east of the foothills, were hot; the highest temperatures were on the 25th-28th.

PRECIPITATION.

The precipitation was irregularly distributed. In the northern half of the district it was as a rule considerably above the seasonal average, but there were scattered localities with less than normally occurs in August. In the southern half the irregularity was more pronounced, and some stations had a monthly excess of more than 2 inches, while adjacent localities had a corresponding deficiency. Heavy local rains occurred in each of the States comprising the district; the greatest number doubtless occurred in South Dakota and northwestern Iowa. The heaviest precipitation for the entire month was 9.44 inches at Alton, on the Solomon River, in north-central Kansas. The greatest amount in 24 hours was 4.87 inches, also at Alton.

The only snow reported was a trace at a very elevated station in Lewis and Clark County, Montana.

RIVERS.

Some of the small streams were high for short periods on account of excessive local rains. These rains, however, had no material effect upon the larger streams, the stages of which were quite normal.

ELECTRIC INDUCTION BY CLOUDS DURING THUNDERSTORMS.

By HARRY A. FRISÉ, Assistant Observer, United States Weather Bureau.

A phenomenon illustrating the electro-inductive action of clouds during thunderstorms was observed at Sheridan, Wyo., on the afternoon of July 11, 1912, and while known to have occurred on two previous occasions, its relation to cloud induction was more closely observed on this last one.

The sky during the day had been mostly cloudy, cumulus and strato-cumulus prevailing; the winds were light and variable, being mostly northerly; the temperature was moderate, with a maximum of 79° about 3 p. m. About 5 o'clock in the afternoon a bank of dark cloud along the horizon to the northwest apparently was moving toward the station. At 5.30 p. m. the cloud mass had advanced so that a third of the sky was overcast with dark cloud masses, stretching from southwest to northeast. Lightning at this time occurred mostly from the cloud directly north of the station, while a rain curtain fell from the entire front of the cloud bank. In order that the advance of the storm might be observed to the best advantage, the roof of the observatory, a two-story structure, was chosen as a suitable point. From the roof of the building at 5.55 p. m. the front of the storm, then within 2 miles of the station, was marked by a cloud of dust, stirred up from the hills and roadways

by the outrushing surface wind characteristic of this class of storms, and stretching at right angles to the direction of advance. On stepping to the roof from the penthouse, a peculiar sound was noticed coming from the anemometer and wind-vane support. Having had experience with electrostatic machines, the sound was instantly referred to the escape of electricity from the iron points about the support. The air was calm just before the rush of surface wind, so that conditions were favorable for observing the phenomenon.

The nature and cause of the sounds were made apparent by their association with lightning discharges from dense cloud masses directly north of the station, which were at this time about 3 miles distant (distance computed by time required for report of discharge to reach station).

It was observed that the sounds ceased for a moment, and then gradually increased in intensity, and that the cessation of sound was coincident with discharge between the earth and clouds. During the short periods in which the sounds increased in intensity it was evident that the stress between the cloud and the earth was becoming greater and that the cessation of sound was owing to the relief of stress which the discharge afforded.

The same phenomenon was observed on the night of February 18, 1912, during a heavy fall of snow, when lightning was seen to the southeast of the station, but no thunder was heard. The sound on this occasion was identical with that of the recent thunderstorm, with this difference: During the snowstorm there was no variation in the intensity, nor was there any cessation of sound during the time it was observed. As the purpose of going to the roof during the snowstorm was to locate the part of the sky in which lightning occurred, the length of time the sound continued was not obtained, nor was the nature of the sound, at that time, referred definitely to electric discharge. Although darkness prevailed no illumination was observed about the iron support.

The frequency of discharge during the recent storm was not so great as to preclude the detection of time intervals. To one familiar with the sounds produced by a static machine, those about the iron support may be made intelligible by comparison with the discharge between the electrodes when they are separated by about one-sixteenth inch, and the plates are revolved moderately.

The observatory is a brick structure, with stone foundation, and soil almost wholly gravel, on the first bench on the west side of the valley of Little Goose Creek. The roof of the building is flat and covered with pitch and gravel. The walls of the building extend above the roof 3 to 5 feet, forming a parapet. The parapet is

capped with galvanized sheet iron, painted. The iron support for the wind vane and anemometer is set into the roof of the penthouse, and is braced by three iron guy rods, imbedded at the foot in the pitch and bolted to the wood boards beneath. The topmost point of the support is an arrow-shaped piece of iron, capping the shaft on which the vane turns, and is about 24 feet above the main roof.

The recent phenomenon was observed for about eight and one-half minutes, during which time five discharges of lightning from the cloud occurred, and there were as many cessations of sound from the iron support, but on account of heavy rain and hail it was necessary to leave the roof at 6.03 p. m. so that the exact time the phenomenon lasted is not known.

This phenomenon has probably been observed by others and has undoubtedly occurred on other structures having connections with moist earth, and high points favorable to electric discharge, but an account of it is believed to be of interest in furnishing evidence to confirm the modern theory of protection of buildings from lightning.

A SEVERE STORM AT CONCORDIA, KANS.

By J. W. BYRAM, Observer, United States Weather Bureau.

A severe thunderstorm swept over Concordia and its vicinity on the night of August 5-6. The first thunder was heard at 8.16 p. m., and the last at 7.34 a. m. The storm came from the northwest. The wind attained a velocity of 51 miles per hour, from the northeast, for the five minutes ending at 8.50 p. m., and during this time 1 mile was blown at the rate of 60 miles per hour.

Four buildings in the business section of Concordia were unroofed; the Presbyterian church was unroofed and otherwise damaged; the Barons House, the principal hotel, was unroofed and one of its large chimneys was blown down, causing great damage to the interior of the building. The building in which the Weather Bureau office is located was partially unroofed, and the office rooms were flooded. Large plate glass fronts in three storerooms were blown in, and a number of barns in town and in the surrounding country were destroyed. The main tent at the Chautauqua grounds was blown down and a number of persons injured slightly. The wind destroyed shade trees in all portions of the town, and orchards in the surrounding country were damaged or destroyed by wind and hail. The barn on the Nallieux farm, 5 miles southeast of Concordia, was destroyed, and a strip of country about 1 mile wide, extending south from this farm to the county line, was devastated by hail. No hail fell in Concordia.